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ORD # 4602-67

4 August 1967

MEMORANDUM FOR: [] NPIC

SUBJECT : [] Technical Reports Evaluations

1. The attached are short evaluations of [] Technical Reports recently received. As you know, they constitute a stack of documents about a foot high. Consequently, my review may not do justice to their merit.

2. On the whole, I feel [] has (or has developed on the basis of the preliminary contract work) a competent team in the human factors area in regard to photointerpretation. If their effort is too scattered and diverse, it is a consequence of initial underestimation of the problems subtleties rather than incompetence. There are a few instances where I would disagree with them concerning experimental design, after the fact. However, on the whole I think they have done a satisfactory job.

3. In regard to the overall problems, I have nothing to add to what has been previously stated:

(a) A need for a complete system analysis; including requirements, information flow, task analysis, criteria for PI completeness and accuracy, authority, and responsibility, etc.

(b) At least one human factors specialist on the staff. Judging from the numbers and diversity of contracts in addition to [] you could probably use two people if you are to adequately monitor additional contracts from the human factors standpoint.

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(c) Perhaps some additional effort on the probable NFIC requirements for 1970 so that we will not continuously be in the position of firefighting and never quite keeping up with the human factors requirements to meet the rapid advances in image technology and data collection.

(d) Although of minor importance to your total problem, I thought the human factors evaluation of your current operations was very worthwhile and should be continued during the evaluation of all future equipment. Perhaps as [] has suggested: (1) the ability to see stereo over a reel rather than in chips and (2) quick retrieval and simultaneous presentation of antecedent and collateral information when the interpreter is faced with unfamiliar photography may result in more significant improvement.

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(e) Your comments concerning the experienced PI "recruitment well" running dry again emphasizes the importance and seriousness of the training problem. I believe, as you suggested, utilization of the AF training program might be the best bet until we can get more definitive data on the real value of teaching machines and paired associates method of training as applied to the PI task.

(f) Of course, we will always be faced with these nubilous problems of trying to quantify motivation, fatigue, stress, morale, etc. So until someone develops a psychological thermometer we will have to work at an empirical level and hope for the best. On the subject of motivation, [] suggested that it might be advisable to permit the interpreters with prior interest in geology or oceanography, for example, to spend some small portion of their time examining photography related to their interest. Encouragement might also be given for them to alert the system about information not specifically requested, information related to agriculture, population changes, etc. rather than to specific military objectives.

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4. Until I take the opportunity to become more intimately acquainted with your total operation, my comments must remain at the level of the above generalities. However, approximately 1 September, I hope to accept your frequent invitations to "live" with the work" for awhile in lieu of report evaluation in a vacuum.

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5. I hope that your travel schedule will permit our meeting with []

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Distribution:

Orig. + 1-Addressee
✓ 1 - DD/ORD
1 - CHM
1 - File
1 - Readingfile
1 - ORD Chrono

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BSD/ORD/DD/S&T: [] (4August1967)

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HUMAN FACTORS RESEARCH PROGRAM (con't.)

Application of State-of-the-Art to Sponsor Operations:

This is essentially a human factors evaluation of PI tasks, equipment, and ambient conditions. Numerous positive recommendations were made in such areas as equipment selection, seating & equipment placement, desk and room illumination, etc., appeared to be a worthwhile evaluation.

Image Interpretation Bibliography

This is quite an extensive bibliography. Although many of the cited items are only remotely related to the sponsors task. However, the bibliography is so indexed that the user can pinpoint relevant material with little effort. Regardless of the value to NPIC, I'm sure it was a necessary pre-requisite for personnel to begin work on this contract.

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Illumination and Interpreter Performance:

This was one of the portions of the effort based upon experimental evidence. The study investigated the effects of two color temperatures (2360 degrees K and 5500 degrees K) on target detection and mensuration performance, lateral phoria, and visual acuity. No significant effect on any of the dependent variables. However, college students were used as subjects without prior PI training which demonstrated a high learning factor. This may have washed out any significant differences. Any continued effort in this area should seriously consider subject selections, pre-training, and pre-experimental evaluation of test stimuli.

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Image Interpretation State-of-the-Art Review:

This is essentially an outgrowth of the bibliographic collections. The various areas of PI are summarized in prose and tabular form. Should be a useful document.

Quantitative Determination of Image Quality:

The essential purpose of this study was to determine if there is a quantitative measure of image quality. The modulation transfer function, contrast, and granularity were systematically varied for

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a set of stimulus photographs. The correlation of these measures with PI judgements of image quality were very high (.92), indicating a reasonable objective measure of image quality, under the conditions of this experiment. With further refinement it should be a valuable tool in many future R&D studies.

Effects of Work Pacing and Teaming on Interpreter Performance:

This study was designed to determine (a) the value of work pacing schedules and (b) individual versus team performance on the accuracy and completeness of the PI task. Although the experiment was rather complex and generalizations cannot be made beyond the conditions of this experiment, the authors conclude:

- (1) No basis for external packing work time increments.
- (2) If accuracy is more important than completeness, the parallel PI teams should be used, with only agreed upon responses scored.
- (3) Series interpreter teams seem to be best compromise to achieve both completeness and accuracy.

The authors note that additional research is required.

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